


# Stone Fruit IPM for Beginners

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Chapter 24

## Mites

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## Mites

European red mite, *Panonychus ulmi* (Koch)

Twospotted spider mite, *Tetranychus urticae* (Koch)

Plum rust mite/peach silver mite, *Aculus fockeui* (Nalepa & Trouessart)

## Hosts

European red mite is the most important mite species attacking all tree fruits in North America. Twospotted spider mite also attacks all deciduous fruit trees. The plum rust mite, also called the peach silver mite, attacks plums, peaches and cherries.

## Time of concern

**European red mite**

European red mites (Fig. 1) overwinter as fertilized eggs (Fig. 2). Egg hatch is closely correlated with bud development and first occurs when apples buds are in the tight cluster stage; hatch is more than 50 percent complete at the pink stage, and virtually 100 percent complete by the end of bloom. The first summer eggs can, as a rule, be found at petal fall or at latest by fruit set. There are four to nine generations of European red mite a year, depending on the locality and length of the growing season. Environmental factors such as diminishing food supply, temperature and photoperiod trigger winter egg production from mid- to late August, but this may continue until late September.

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Fig. 1. European red mite adult female.

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Fig. 2. European red mite overwintering eggs.

**Twospotted spider mite**

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Fig. 3. Twospotted spider mite adult.

Twospotted spider mites (Fig. 3) overwinter as diapausing females in protected places on the tree or in the duff at the base. When weather warms in the spring, typically a few days or weeks before bloom, the females become active and seek out the newly emerged green tissues to feed. After the first generation in the spring, the generations begin to overlap, and all stages are usually present at the same time. The number of generations depends on the climate to some extent; this species can continue to reproduce if warm weather persists in the fall, or they can begin to overwinter well ahead of the cooler temperatures if food quality declines.

**Plum rust mite**

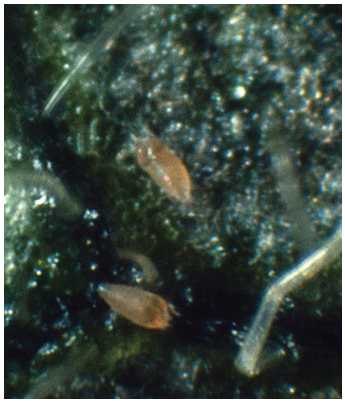

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Fig. 4. Plum rust mite adult.

Female mites (Fig. 4) overwinter chiefly in the cavities of dead or shrunken buds, and to some extent in crevices of twigs and bark; mites begin to leave the buds and migrate into the expanding foliage as the buds open, scattering over the foliage to feed for a few days. Peak populations usually occurs in late July, and overwintering females start being produced in August. Males, which do not overwinter, die in the fall.

## Damage, symptoms and pest cycle

**European red mite**

Injury is caused by the feeding of all stages on the foliage. The lower leaf surface is preferred. Under

high populations, both surfaces are fed upon. The injury is caused by the piercing of the cell walls by the bristle-like mouthparts and the ingestion of their contents, including the chlorophyll. The injury results in off-color foliage that in severe cases becomes bronzed (Fig. 5, right), as compared to uninfested foliage (Fig. 5, left). The leaf efficiency and productivity is directly affected. Heavy mite feeding early in the season (late June and early July) not only can reduce tree growth and yield, but also drastically affect fruit bud formation, and thereby reduce yields the following year. Additionally, mite-injured leaves will not respond to growth regulators applied to delay harvest drop.

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Fig. 5. European red mite foliar feeding damage.

**Twospotted spider mite**

All motile stages feed on tree foliage, with most of the feeding concentrated on the lower leaf surface. Mites have piercing-sucking mouthparts that penetrate the leaf cells and withdraw the contents, including chlorophyll. The injury caused (Fig. 6) is similar to that of European red mite; however, bronzing is more gray, and there is much more webbing present than occurs from similar populations of European red mite.

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Fig. 6. Twospotted spider mite foliar feeding damage on apple.

**Plum rust mite**

The mites live on the upper and lower surfaces of the leaves along the midribs. They feed extensively on only young foliage, so injury is confined chiefly to terminal growth. Though the mite is common on mature trees, particularly on water sprouts and terminal shoots, serious injury has been noticed particularly on nursery stock. Feeding causes the leaves to roll upward longitudinally and turn brown (Fig. 7). Symptoms may be present over the entire tree. Early injury to the leaf may cause dwarfing of the foliage and a brown or bronze scurfy condition on the lower leaf surface.

On plums, individual leaves may exhibit a condition known as “chlorotic fleck.” Symptoms of chlorotic fleck are more or less well-defined chlorotic areas (abnormally yellow plant tissue resulting from partial failure to develop chlorophyll) that range in size from mere spots to 1-2 millimeters in diameter. The number of flecks on a single leaf may vary from one to more than 50. If sufficiently numerous flecks are present, the leaf may become twisted. Severely infested shoots are rosetted, and many leaves do not expand to normal size. Symptoms may occur on the bark of plum shoots in the form of ovoid spots.

In cherries, partial defoliation will occur under severe infestations.

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Fig. 7. Plum rust mite foliar damage.

## IPM steps for beginners

Mites are known as “induced pests”—they only reach outbreak conditions where biological control is disrupted (e.g., by pesticides used in commercial orchards); levels on unsprayed trees are usually

negligible. Mites have a number of insect predators, including small black lady beetles in the genus *Stethorus* and some predatory bugs, but by far the most successful spider mite biocontrol agents are predatory mites in the family Phytoseiidae, and to a lesser extent, Stigmaeidae. These species (e.g., *Galendromus occidentalis*, *Neoseiulus fallacis*, *Typhlodromus pyri*) live in close association with their prey, and in many cases have become tolerant of orchard pesticides. This allows them to continue providing biological control even in the presence of multiple pesticide inputs.

While biological control plays a significant role in spider mite management worldwide, controlling direct (fruit-feeding) pests may necessitate using disruptive chemicals in the orchard. A number of specific miticides are currently available, with activity either on the eggs (ovicides or ovicide/larvicides) or the adults. Ovicides typically work better early in the season, or when population densities are still low. High populations are better controlled with an adulticide (alone or in combination with an ovicide). European red mites can be readily controlled by thorough and timely acaricide applications. The most effective treatments are those applied after new growth has appeared but ahead of bloom. Seasonal control can often be obtained with a single petroleum oil spray directed against the overwintering eggs or the application of an acaricide toxic to the newly hatched forms. Against established populations in the summer, it is often necessary to make two applications 10-14 days apart. In cherries, plum rust mites often become a problem after harvest; if necessary, take chemical control measures after harvest to ensure tree vigor for the winter.

Spider mites have a long history of developing resistance to pesticides, therefore a program of resistance management should always be a primary concern when developing a chemical control program. Rotating materials with different modes of action, combined with using biological control whenever possible, should help prevent resistance from developing.